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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|-------------------------------|---------------------|------------------|
| 09/759,781 | 01/11/2001 | Gregory H. Rau | S-96306 | 9670 |
| 7590 03/09/2004 | | | | |
| Paul A. Gottlieb/U.S. Dept. of Energy GC-62 (FORSTL) MS-6F-067 1000 Independence Avenue S.W. Washington, DC 20585 | | | | |
| | | EXAMINER LANGEL, WAYNE A | | |
| | | ART UNIT PAPER NUMBER 1754 | | |

DATE MAILED: 03/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.



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09/159781

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| EXAMINER |
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| ART UNIT | PAPER NUMBER |
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DATE MAILED:

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

OFFICE ACTION SUMMARY

- ☐ Responsive to communication(s) filed on _____
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 D.C. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

- ☒ Claim(s) 1-34 is/are pending in the application.
- Of the above, claim(s) 1-17 is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 18-34 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☒ Claims 1-34 are subject to restriction or election requirement.

Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
- ☐ received.
- ☐ received in Application No. (Series Code/Serial Number) _____
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

- ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- ☒ Notice of Reference Cited, PTO-892
- ☐ Information Disclosure Statement(s), PTO-1449. Paper No(s). _____
- ☐ Interview Summary, PTO-413
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

Restriction to one of the following inventions is required under 35 U.S.C. § 121:

I. Claims 1-17, drawn to an apparatus for extracting and sequestering CO₂ from a gas stream, classified in Class 422, subclass 168.

II. Claims 18-34, drawn to a method of extracting and sequestering CO₂ from a gas stream, classified in Class 423, subclass 220.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by another and materially different apparatus, such as one in which the hydration of the CO₂ to form carbonic acid, and the reaction of the carbonic acid with carbonate to form a waste stream solution of metal ions and bicarbonate do not take place in a single reactor vessel. The two process steps could be carried out in separate reactor vessels, for example.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classifications, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, and vice versa, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Chang on February 3, 2004 a provisional election was made with traverse to prosecute the invention of Group II, claims 18-34. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-17 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 18-34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over European 487102 in view of Ebinuma. European 487102 discloses a process for separating carbon dioxide gas, in which carbon dioxide gas is absorbed in an alkaline solution such as a potassium carbonate solution and the resulting solution is then heated to release carbon dioxide gas. (See column 1, lines 27-32 and column 7, lines 41-53.) European 487102 teaches at column 8, lines 8-23 that the bicarbonate is formed at a pH of 8 to 12. The carbon dioxide in the gas stream treated with the aqueous solution of potassium carbonate would inherently be hydrated to form carbonic acid in the process of European 487102, since an aqueous solution of the potassium carbonate is used to

absorb the carbon dioxide gas. The differences between the process disclosed by European 487102, and that recited in applicant's claims, are that European 487102 does not disclose that the stream generated by the reaction with the carbonate solution should be pretreated to reduce the amount of carbon dioxide outgassing and carbonate precipitation that may occur after the stream solution is released into a disposal site, and releasing such pretreated waste stream solution into the disposal site. Ebinuma discloses a method for dumping and disposing of carbon dioxide gas into the ground of the sea bottom. (See the Abstract and column 1, line 14 - column 2, line 51.) It would be obvious from Ebinuma to release the stream formed by the reaction between the carbon dioxide gas and potassium carbonate solution in the process of European 487102 into a disposal site such as the ocean, since Ebinuma teaches at column 1, lines 23-28 that a method for dumping carbon dioxide to prevent temperatures on the earth from rising involves dumping carbon dioxide into the ocean.

Accordingly one of ordinary skill in the art would be motivated to introduce the carbon dioxide gas formed in decomposition tank 15, as disclosed at column 11, lines 32-34, into the ocean. It would be further obvious from Ebinuma to pretreat the solution formed by the reaction between the carbon dioxide gas and the aqueous potassium carbonate solution to reduce the amount of

carbon dioxide outgassing and carbonate precipitation that may occur after the waste stream solution is released into the ocean by any known or conventional manner, since Ebinuma discloses at column 2, lines 7-9 that dumping carbon dioxide into the ocean has a bad influence on oceanic life and gives rise to destruction of oceanic environment. Accordingly one of ordinary skill in the art would be motivated to pretreat the solution to reduce the amount of such carbon dioxide outgassing so as to minimize the destruction of the environment.

Claims 20, 21, 24, 25, 31 and 32 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 20, 21, 24 and 25, there is no antecedent basis for "the apparatus". The word "apparatus" should be changed to --method-- to avoid this rejection. In claims 31 and 32, there is no antecedent basis for "said large body of water" in claim 27. Moreover, the word "large" renders the scope of the claims vague and indefinite, since it is not clear where the line of demarcation would be between a "large" body of water and a "small" one.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wayne A. Langel whose telephone number is (571) 272-1353. The examiner

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can normally be reached on Monday through Friday from 8 A.M. to 3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman, can be reached on (571) 272-1358. The fax phone number for this Group is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either private PAIR or public PAIR. Status information for unpublished applications is available through private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WAL:cdc

March 5, 2004

Wayne A. Langel
WAYNE A. LANGEL
PRIMARY EXAMINER